



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/538,524 | 06/10/2005 | Kenji Kiyama | 500.45104X00 | 3701 |
| 20457 7590 12/02/2009 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873 | | | | |
| EXAMINER | | | | |
| BASICHAS, ALFRED | | | | |
| ART UNIT | | PAPER NUMBER | | |
| 3743 | | | | |
| MAIL DATE | | DELIVERY MODE | | |
| 12/02/2009 | | PAPER | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/538,524

Applicant(s)

KIYAMA ET AL.

Examiner

Alfred Basichas

Art Unit

3743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 August 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2 and 4-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2 and 4-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 2, 4-11, and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita et al. (US 4,545,307) in view of Garcia-Mallol (US 5,272,480) and Tsuzi (4,135,874).

With respect to claim 2, Morita et al. discloses a burner (see fig. 1) burning a fuel within a furnace in a theoretical air ratio or less (col. 1, ln. 45-50); an air port 57 arranged downstream of the burner and injecting additional combustion air into the furnace; and an inhibiting gas supply means 12 for supplying a nitrogen oxide generation inhibiting gas inhibiting a nitrogen oxide from being generated provided in a mixing region formed by both of a combustion gas generated by burning the fuel by means of said burner and a combustion air injected from said air port or near the mixing region, wherein said nitrogen oxide generation inhibiting gas is constituted by at least one gas selected from a group comprising a combustion exhaust gas, a mixed gas of the combustion exhaust gas the air, and low temperature air (col. 8, ln. 38-39). Morita

et al. is ambiguous as to the details of air port 57 and fails to specifically recite the blower/exhaust gas arrangement.

As regards the air port details, Garcia-Mallol discloses a similar invention including an over-fire air port control system. Garcia-Mallol further discloses motivation to combine. (col 2, ln. 10-17) It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the furnace and air port of Morita et al. with the over-fire air port control system of Garcia-Mallol for the purpose of precisely controlling fuel-air ratios and minimizing nitrous oxides. The control system of Garcia-Mallol has an inner side of the air port separated into a flow path 28 injecting said combustion air, and a flow path 30 injecting said nitrogen oxide generation inhibiting gas 30. (The secondary air flowing from path 28 is considered to be "combustion air" in that it is combusted, the secondary air flowing from path 30 is considered to be "nitrogen oxide generation inhibiting gas" in that the staged combustion using this air inhibits nitrogen oxide generation.)

As regards the blower/exhaust circulation, Tsuzi teaches an industrial boiler in which a blower g for circulating combustion exhaust gas from the outlet of the furnace and mixed with air at the inlet b,c so as to reduce NOx (see at least col. 1, lines 42-47). Accordingly, it would have been obvious to one having ordinary skill in the art to incorporate the recirculation arrangement taught by Tsuzi into the invention disclosed by Morita, so as to reduce NOx.

With respect to claim 26, Morita et al. further discloses the claimed subject matter wherein said nitrogen oxide generation inhibiting gas is constituted by at least one gas selected from the group consisting of a combustion exhaust gas, a mixed gas of the combustion exhaust gas and air, and air having a temperature lower than that of the additional combustion air. (col. 8, ln. 38-39).

With respect to claim 13, Morita et al. further discloses the claimed subject matter wherein a plurality of air ports 57 are placed along a width direction of said furnace (see fig. 1). The air ports of Garcia-Mallol is provided with inhibiting gas supply means 30 and a flow rate regulating means 20b for regulating a flow rate of the nitrogen oxide generation inhibiting gas.

With respect to claim 14, Morita et al. further discloses the claimed subject matter wherein a plurality of air ports 57 are placed along a width direction of said furnace (see fig. 1), each of the air ports is provided with said inhibiting gas supply means 30, and a flow rate regulator 22a and 22b. The recitation of “for providing an increased flow of...” is considered intended use. A recitation of the intended use of the claimed invention must result in a definite structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use it is considered to disclose the claim limitation. Garcia-Mallol is considered to disclose this claim limitation in that the flow rates are adjustable via dampers 22a and 22b, and thus a plurality of the air ports would be capable of having any combination of relative flow rates.

With respect to claim 15, Garcia-Mallol further discloses the control system wherein a total supply flow rate of the nitrogen oxide generation inhibiting gas supplied to said plurality of air ports is variable in correspondence to a load of said combustion apparatus. (fig. 1; col. 3, ln. 66-col. 4, ln. 2.)

With respect to claim 16, Garcia-Mallol further discloses the claimed subject matter wherein a total supply flow rate of the nitrogen oxide generation inhibiting gas supplied to said plurality of air ports is variable in correspondence to a nitrogen oxide discharging concentration of said combustion apparatus. (fig. 1; col. 3, ln. 66- col. 4, ln. 2; col. 3, 30-45; Garcia-Mallol is considered to disclose the claim limitation in that it discloses a variable flow rate based on the stoichiometric ratio of the burner, which is interrelated with the concentration of nitrogen oxide.)

With respect to claim 4, Garcia-Mallol further discloses the claimed subject matter wherein said nitrogen oxide generation inhibiting gas is injected into the furnace from an inhibiting gas injection port provided on an outer peripheral portion side of an air injection port of said air port. (fig. 1, flow path 30 is on the outer periphery of the air port.)

With respect to claim 5, Garcia-Mallol further discloses the claimed subject matter wherein said inhibiting gas injection port is formed in an annular shape so as to surround the air injection port of said air port. (col. 3, 14-16; flow path 30 is describes as being annular, thus surrounding flow path 28.)

With respect specifically to claim 6, Garcia-Mallol discloses said inhibiting gas injecting port arranged in a peripheral direction so as to surround the air injection port of

said air port. (col. 3, 14-16; flow path 30 is describes as being annular, thus surrounding flow path 28.) With respect to the recitation of “a plurality of said inhibiting gas injecting ports,” it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide duplicative concentric ports of the type disclosed by Garcia-Mallol because duplication of parts is considered to be *prima facie* obvious. MPEP 2144.04; *In re Harza*, 274 F.2d 669 (CCPA 1960).

With respect specifically to claim 7, Garcia-Mallol discloses said inhibiting gas injection port being formed approximately in a circular arc shape so as to surround a part of the air injection port of said air port. (col. 3, 14-16; flow path 30 is describes as being annular, thus surrounding flow path 28.)

With respect specifically to claim 8, Garcia-Mallol discloses said inhibiting gas injection port is concentrically arranged in a part of an outer peripheral portion of the air injection port of said air port. (fig. 1, flow path 30 is on the outer periphery of the air port; col. 3, 14-16, flow path 30 is describes as being annular.) With respect to the recitation of “a plurality of said inhibiting gas injection ports,” it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide duplicative concentric ports of the type disclosed by Garcia-Mallol because duplication of parts is considered to be *prima facie* obvious. MPEP 2144.04; *In re Harza*, 274 F.2d 669 (CCPA 1960).

With respect specifically to claim 9, Garcia-Mallol discloses said inhibiting gas injection port is arranged in the burner side of the air injection port of said air port. (fig.

1; flow path 30 is partially on the bottom side of flow path 28, which corresponds to the side closest to the burner.)

With respect to claim 10, Garcia-Mallol further discloses the claimed subject matter wherein further comprising a system for supplying a part of exhaust gas recirculation within said furnace as the nitrogen oxide generation inhibiting gas in a branched state. (see fig. 1, the flow paths are considered to be "branched.")

With respect to claim 11, Garcia-Mallol further discloses the claimed subject matter wherein a blower exclusive for the nitrogen oxide generation inhibiting gas is placed in said inhibiting gas supply system for supplying a part of exhaust gas recirculation. (col. 1, ln. 37; "separate blowers...")

3. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morita et al. (US 4,545,307) in view of Garcia-Mallol (US 5,727,480) and Tsuzi (4,135,874) and further in view of Kobayashi et al. (US 5,231,937).

With respect to claim 12, Morita et al. discloses the use of a mixture of air and exhaust gas, or exhaust gas alone. (col. 8, ln. 38-39.) Morita et al. does not disclose said nitrogen oxide generation inhibiting gas being constituted by an exhaust gas after a temperature thereof is lowered by a heat exchanger. It is old and well-known in the art to lower the temperature of an exhaust gas by means of a heat exchanger, as evidenced by Kobayashi et al. (fig. 1.) It would have been obvious to provide the heat exchanger of Kobayashi et al. with the furnace system of Morita et al. because all of the claimed elements were known in the prior art and one skilled in the art could have

combined prior art elements according to known methods with no change in their respective functions, and the combination would have yielded predictable results.

Response to Arguments

Applicants' arguments with regard to the rejected claims have been considered, but are not deemed fully persuasive.

As regards applicants' arguments regarding Morita, it is again reiterated that while it is true that Figs. 1 and 2 depict a conventional combustion apparatus, the difference between that and the invention disclosed by Morita involves the burner throat area 18. Accordingly, Morita does not teach away from a combustion device generically depicted in fig. 1.

Applicants assert that Morita fails to disclose an air port, the inner side of which is separated into a flow path injecting additional combustion air, and a flow path injecting nitrogen oxide generation inhibiting gas. Applicants are again reminded that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Garcia-Mallol teaches the claimed air port details.

Applicants attack Garcia-Mallol for its alleged teaching of the air having the same composition and temperature flows out therefrom. Applicants have failed to substantiate this allegation and further failed to provide the relevance thereof to any of the claimed limitations. Although the claims are interpreted in light of the specification,

limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicants further assert that the addition of Tsuzi would significantly reduce the efficiency of the plant, but have failed to substantiate the allegation. Additionally, applicants are reminded that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alfred Basichas whose telephone number is 571 272 4871. The examiner can normally be reached on Monday through Friday during regular business hours.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Tech Center telephone number is 571 272 3700.
December 2, 2009

/Alfred Basichas/
Primary Examiner, Art Unit 3743